

# Effect of kinesitherapy on quality of life of students with chronic bronchitis

Oleksandr Petruhnov<sup>1</sup>  
Larysa Ruban<sup>2</sup>

<sup>1</sup>Kharkiv National Medical University, Kharkiv, Ukraine

<sup>2</sup>Kharkiv State Academy of Physical Culture, Kharkiv, Ukraine

**Purpose:** to determine the effectiveness of kinesiotherapy on the quality of life of students with chronic bronchitis in the period of convalescence.

**Material & Methods:** under our supervision there were 73 students aged 17–20 years old, who were divided into three groups. According to the demographic indicators, the groups studied were homogeneous by sex, age, height and weight. To determine the index of the quality of life of students, we used a theoretical analysis of the literature and the synthesis of scientific, methodological and special literature information; computer test program "Evaluation of the quality of your life".

**Results:** when analyzing the results, we noticed that the students of gr. 1 and gr. 2 although they have an average QLI, however, the counting of answers indicates that the state of health of these young men is in a state of limitation. A comprehensive program of physical rehabilitation was drawn up taking into account two stages of the recovery period. Students gr. 1, from the first day, walking was prescribed on various health-normalizing modes with a combination of hand movements permutations. Students gr. 2 were engaged 3 times a week under the program of kinesiotherapy for special medical groups, gr. 3 were engaged in physical culture in accordance with the generally accepted program of the Ministry of Education and Science of Ukraine. After the application of the developed program, an increase in the quality of life of students of both groups was observed, respondents gr. 1 noted a decrease in fatigue, increased mobility, increased physical activity, thinking, and improved personal relationships. Students gr. 2 marked a trend of positive changes in the quality of life and health.

**Conclusion:** confirmation of the effectiveness of the developed program was statistically significant changes in students gr. 1 who were engaged in this program. Students gr. 2 also showed a positive dynamic of QLI, but there were no statistically significant changes.

**Keywords:** students, chronic bronchitis, quality of life index.

## Introduction

The future of each country in terms of its social, economic, cultural development is determined by the state of public health, especially young people. Scientific studies over the past five years indicate a steady increase in students who, due to health reasons, are completely exempted from physical education classes, the number in groups of physiotherapy exercises has increased 4–5 times, and in special medical groups – 2 times [3–8].

In this regard, special attention is required to analyze the health status of students of higher educational institutions, the percentage of incidence of which is growing steadily [1; 2]. Non-specific respiratory diseases in adolescents and youth have recently caused great concern, which is associated with an increase in morbidity, the prevalence of disability and mortality from them in the adult population. The incidence of respiratory system in recent decades is from 10% to 40% in different regions of the world. Among the diseases of the respiratory system, the leading place is occupied by chronic bronchitis (about 65%) [3–7].

Respiratory organs, as the body's most open system, experience a significant influence of a set of adverse environmen-

tal factors, which can lead to their structural and functional damage and determine the climatic and geographical and regional differences in the prevalence of major respiratory diseases. According to academician A. G. Chuchalin (2004), among children and adolescents there is an increase in the prevalence of respiratory diseases, which can lead to an increase in the number of adult patients suffering from chronic pulmonary pathology [8–11].

Modern medicine has all kinds of pharmacological drugs for the treatment of respiratory diseases. However, drug therapy causes a significant number of side effects and is a passive treatment, does not take into account and does not include the reserve capabilities of the body. According to many authors, in the complex treatment of patients with chronic bronchitis, physical therapy is an integral part and occupies a decisive place among rehabilitation and rehabilitation measures. Under the influence of the targeted and systematic use of kinesiotherapy, both special and general developmental exercises, the function of external respiration is greatly enhanced, and exercises to increase the strength of the muscles of the body have a positive effect on the function of the diaphragm, which largely determines good drainage even of the basal bronchi and deep located bronchioles. The possibilities of kinesiotherapy for patients with chronic bronchitis, especially

students, should be considered precisely depending on the form of the disease and the degree of impaired pulmonary ventilation [12]. One of the forms of kinesiotherapy after exacerbation of chronic bronchitis is the use of walking and running in various health-normalizing modes with a combination of permutations of hand movements that promote breathing, have a positive effect on the respiratory system, increase the effectiveness of treatment, improve well-being and psycho-emotional state [11; 14].

In recent decades, there has been a significant increase in research in the field of quality of life. The study of quality of life is very relevant both in medicine and in physical therapy. Assessing the quality of life makes it possible to assess the complex effect of the disease on the patient's life, compare the effectiveness of intervention programs, and predict the course of the disease. Studying the direction of changes in the quality of life indicators associated with the illness of students will help to determine the most significant limitations in the quality of life and influence them in order to optimize this indicator.

**Purpose of the study:** to determine the effectiveness of kinesiotherapy on the quality of life of students with chronic bronchitis in the period of convalescence.

## Material and Methods of the research

Examination and physical therapy of students with chronic bronchitis were carried out at the University Hospital of Kharkov National Medical University. Under our supervision, there were 73 students aged 17–20 years who were divided into three groups. According to demographic indicators, the groups of subjects were homogeneous by gender, age, height-weight indicators. The first group (gr. 1) included 25 students who took a course of physical therapy according to the developed program using varieties of walking and running in various health-normalizing modes, the second group (gr. 2) included 21 students involved in the program kinesiotherapy for special medical groups, the third group (gr. 3) – 27 healthy students, engaged in physical education according to the generally accepted program of the Ministry of Education and Science of Ukraine.

To determine the index of quality of life for students, we used a computer test program "Assessing the quality of your life", developed by L. A. Ruban, S. V. Stavitsky (author. Certificate No. 70372 of 02.10.2017) (Fig. 1).

The test program consists of 36 questions, which help to assess the areas of quality of life: physical, psychological functions, level of independence, social relations, as well as the respondent's perception of his health and quality of life in general. Assessment of the level of satisfaction was carried out according to the general index of quality of life (IQL): very low (depressive) – 4–10 points; low – 11–20 points; average – 21–29 points; high – 30–40 points.

For people with high IQL, characterized by optimistic optimism



**Fig. 1. Interface of the computer test program "Assessing the quality of your life"**

and activity in life position. Low IQL is often found in individuals with burnout syndrome. A low level of IQL is characteristic for depressed patients.

## Results of the research

At the beginning of the study, students with chronic bronchitis observed most cases with an average level of quality of life index. Table 1 presents the results of the IQL for students with chronic bronchitis (gr. 1 and gr. 2) and students of the comparison group (gr. 3).

**Table 1**  
**Comparative characteristics of the quality of life index of students with chronic bronchitis (gr. 1 and c gr. 2) and students of the comparison group (gr. 3), %**

	Quality of Life Index (IQL) persons / percentage		
	Gr. 1 (n=25)	Gr. 2 (n=21)	Gr. 3 (n=27)
Very low	0	0	0
Low	3/12	5/24	0
Average	22/88	16/76	17/63
High	0	0	10/37

Analysis of the results showed that students of gr. 1 and gr. 2, although they have an average IQL, however, the counting of answers indicates that the health status of these young men is in an extreme state. The respondents of these groups had an average response value of  $22 \pm 1,04$  points, indicating a decrease in the average level.

When analyzing the answers to questions in blocks, it was determined: what block I of the questions (physical criteria) students gr. 1 is estimated at an average of  $6,32 \pm 0,18$  points, students gr. 2 – by  $6,54 \pm 0,16$  points, students of gr. 3 – by  $8,57 \pm 0,74$  points. Regarding questions of the Psychological Criteria block, students with chronic bronchitis noted low self-esteem, which may indicate low self-esteem. An analysis of the issues of the "Level of Independence" block found that the young men of the three groups cannot quickly adapt to life circumstances. Counting the answers to the questions of the blocks "Environment" and "Spirituality" showed that all respondents have experienced life crises over the past 2 years.

Thus, a decrease in the quality of life in students with chronic bronchitis of both groups occurred due to the influence of the

Table 2

Dynamics of the quality of life index of students with chronic bronchitis (gr. 1 and gr. 2) and students of the comparison group (gr. 3), %

Stages	Quality of Life Index (IQL) persons / percentage				
	Gr. 1 (n=25)		Gr. 2 (n=21)		Gr. 3 (n=27)
	before	after	before	after	before
Low	3/12	0	5/24	0	0
Average, 21–23 points	22/88	10/40	16/76	0	
Average, 24–29 points	0	15/60	16/76	5/24	17/63
High	0	0	0	0	10/37

disease on all spheres of life.

To restore the functional state of the respiratory system and improve the quality of life of the examined patient population, we developed a physical rehabilitation program [14], which was made taking into account two stages of the convalescence period, clinical and biological recovery, since even after normalizing human health, objective indicators of the respiratory system function still do not reach the values of healthy individuals. According to the International Classification of Functioning (ICF, 2017), the course of treatment was 21 days [15].

*At the stage of clinical recovery*, students gr. 1 and gr. 2 prescribed kinesiotherapy, massage of the muscles of the body, shoulder girdle, upper limbs; physiotherapeutic agents: UHF alternate with solux on the nose and chest; internally vitamins of group B, C, E; Eleutherococcus (to stimulate the body's resistance). Students gr. 2 were engaged in therapeutic gymnastics 3 times a week, performed general strengthening and general developmental exercises in relation to breathing exercises 4:1. Students gr. 1 from the first day, walking was prescribed in various health-normalizing modes with a combination of permutations of arm movements. Dosed slow run, started from three minutes, every two days its duration was increased by one minute, each exercise in the complex was repeated 6–8 times in the first two or three days of the first stage.

*At the stage of biological recovery*, students of gr. 1 morning morning hygienic gymnastics was performed, in the evening accelerated walking 20 minutes; slow run – 30 minutes; accelerated walking – 10 min. Students gr. 2 continued to perform motor tasks of the first stage, gradually completely replacing them with motor programs, which included special, basic and simulation exercises with an increase in load to the level of a regular training.

The dynamics of the index of IQL students gr. 2 tended to improve. After taking a course of physical therapy, a low level of IQL was observed, all respondents had an average level, but the average value of the responses was from 21 to 23 points. The IQL indicator in gr. 1 also acquired significance to the average level, but in 10 students it ranged from 21 to 23 points,

and in 15 students it ranged from 24 to 29 points, that is, it almost approached a high level.

The overall quality of life of students with chronic bronchitis in both groups during physical therapy is presented in Table 2.

From the Table 2 shows that at the beginning of the study, the level of overall quality of life in the groups of sick students was relatively the same. After applying the developed program of physical therapy, an increase in the quality of life was observed among students of both groups, respondents Gr. 1 noted a decrease in fatigue, increased mobility, an increase in physical activity, thinking, and an improvement in personal relationships. Students gr. 2, there is a trend of positive changes in the quality of life and health status.

### Conclusions / Discussion

A comprehensive program of physical rehabilitation has been developed for students with chronic bronchitis, taking into account recovery periods, especially with the use of walking varieties in various health-normalizing modes with a combination of permutations of arm movements, positively affects the quality of life of students with chronic bronchitis.

Walking is the easiest form of physical activity for people with a sedentary lifestyle. Health walking classes have a complex effect on the human body in different directions. First of all, it is the consumption of energy substances, fats and carbohydrates, in proportion to the duration and speed of walking. Walking provides a relatively high functional load, training and strengthening all body systems, which leads to an improvement in the quality of life in general.

Confirmation of the effectiveness of the developed physical therapy program was a statistically significant change in students gr. 1 who were involved in this program. Students gr. 2, a positive dynamic of the IQL was also observed, but no statistically significant changes were observed.

**The prospects for further research** are related to the study of the dynamics of the level of physical condition and physical performance in students with chronic bronchitis after applying the author's physical rehabilitation program.

**Conflict of interests.** The authors declare that no conflict of interest

**Financing sources.** This article didn't get the financial support from the state, public or commercial organization.

## References

1. Ruban, L. & Stavitsky, S. (2016), "Assessment of the quality of life index of students", *Slobozans'kij naukovo-sportivnij visnik*, No. 4(54), pp. 89-93, doi: 10.15391/sns.v.2016-4.016. (in Russ.)
2. Zhitnitsky, A.A. (2017), "Modern problems of formation of a healthy lifestyle of youth", *Visnyk Kharkivskoho natsionalnoho universytetu imeni V.N. Karazina. Seriya "Valeolohiia: suchasnist i maibutnie"*, Vol. 21, pp. 86-92. (in Ukr.)
3. Yermakov, S.S., Cheslitska, M., Pilevska, V., SharkEtskardt, M., Podrigalo, L.V. & Kriventsova, I.V. (2013), "The health level of students of special medical groups in the context of improving the quality of life", *Visnyk Chernihivskoho derzhavnogo pedahohichnoho universytetu imeni T.H. Shevchenka*, No. 3, pp. 184-189. (in Russ.)
4. Tsys, D.I. (2013), "Sport orientation classes on physical education – one of the factors of increasing the physical fitness of student youth", *Slobozans'kij naukovo-sportivnij visnik*, No. 3, pp. 5-7. (in Ukr.)
5. Bashavets, N.A. (2011), "The state of morbidity of modern student youth and ways of its improvement", *Pedahohika, psykholohiia ta medyko-biologichni problemy fizychnoho vykhovannia i sportu*, No. 7, pp. 6-10. (in Ukr.)
6. Romanchuk, S.V., Petruk, A.P. & Bykov, R.H. (2015), "Aktyvizatsii navchalnoho protsesu z fizychnoho vykhovannia studentiv shchodo vprovadzhenia zdorov'ia zberezhuvalnykh metodyk", *Naukovyi chasopys NPU imeni MP Drahomanova. Seriya 15: Naukovo-pedahohichni problemy fizychnoi kultury (fizychna kultura i sport)*, No. 5 (1), pp. 215-218. (in Ukr.)
7. Cherednichenko, I., Sokolova, O. & Malikov, N. (2016), "Changes in physical fitness indices of a young man of 18–19 years old in the process of sectional sessions with the integrated use of sports games", *Sportyvnyi visnyk Prydniprovia*, No. 3, pp. 239-243. (in Russ.)
8. Lynnyk, M.I., Nedospasova, O.P., Tarasenko, O.R., Kapustiak, V.I., Bushura, I.V. & Nikiforova, L.H. (2017), *Porivnialni dani pro rozpovsiudzhenist khvorob orhaniv dykhannia i medychnu dopomohu khvorym na khvoroby pulmonolohichnoho ta alerholohichnoho profiliiu v Ukraini za 2010-2016 rr.* [Comparative data on the prevalence of respiratory diseases and medical care for patients with pulmonologic and allergic diseases in Ukraine for 2010-2016], Kyiv. (in Ukr.)
9. Belevskiy, A.S. & Novikov, Yu.K. (2008), "Chronic bronchitis in clinical practice", *Lechebnoe delo*, No. 1, pp. 32-38. (in Russ.)
10. Duka, K.D., Ilchenko, S.I. & Ivanus, S.H. (2013), *Khronichnyi bronkhit u ditei ta pidlitkiv – mynule, suchasne ta maibutnie* [Chronic bronchitis in children and adolescents – past, present and future], Dnipropetrovsk. (in Ukr.)
11. Petrukhnov, O.D. & Ruban, L.A. (2017), "Duration of elimination of disturbed functions of the respiratory system in students of different levels of trenirovannost, patients with chronic bronchitis after the application of a comprehensive program of physical rehabilitation", *Scientific Journal "ScienceRise"*, № 1/1(30), C. 32-36. (in Ukr.)
12. Mal'yavin, A.G., Yepifanov, V.A. & Glazkova, I.I. (2010), *Reabilitatsiya pri zabolevaniyakh organov dykhaniya* [Rehabilitation for respiratory diseases], Moscow. (in Russ.)
13. Mingazova, L.R., Selezneva, N.I. & Kildibekova, R.N. (2012), "Efficiency of rehabilitation complexes in chronic bronchitis", *Meditsina: vyzovy segodnyashnego dnya: materialy Mezhdunar. nauch. konf. (Chelyabinsk, June 2012). Chelyabinsk: Dva komsomol'tsa*, pp. 61-62, available at: <https://moluch.ru/conf/med/archive/52/2452/> (accessed by: 8.06.2019). (in Russ.)
14. Petrukhnov, O.D. & Ruban, L.A. (2017), Integrated program of physical rehabilitation for students of different levels of trenirovannost, patients with chronic bronchitis of moderate severity during convalescence. with. No. 72515 Ukraine, Statement. April 10, 2017. No. 73231; post June 27, 2017. (in Ukr.)
15. Melnikova, Ye.V., Buylova, T.V., Bodrova, R.A., Shmonin, A.A., Maltseva, M.N. & Ivanova, G.Ye. (2017), "The Use of the International Classification of Functioning (ICF) in Outpatient and Inpatient Medical Rehabilitation: A Guide for Professionals", *Vestnik vosstanovitel'noy meditsiny*, No. 6 (82), pp. 7-20. (in Russ.)

Received: 20.04.2019.

Published: 30.06.2019.

## Information about the Authors

**Oleksandr Petrukhnov:** *Kharkiv National Medical University: Nauky Avenue 4, Kharkiv, 61022, Ukraine.*

**ORCID.ORG/0000-0003-1004-2290**

**E-mail: Petrukhnov-alex@rambler.ru**

**Larysa Ruban:** *PhD (Physical Rehabilitation); Kharkiv State Academy of Physical Culture: Klochkivska Street 99, Kharkiv, 61058, Ukraine.*

**ORCID.ORG/0000-0002-7192-0694**

**E-mail: slarisaruban@gmail.com**